FORBLUE sunsep™
Membranes for Gas Drying and Humidification
• Introduction
• Applications
  • Pneumatics
  • Gas Analysis
  • Humidification
  • Others
Introduction

Your Dreams, Our Challenge
FORBLUE sunsep Hollow Fiber Membranes

• FORBLUE sunsep modules differ in shape

• All modules incorporate the same hollow fibers
What is FORBLUE sunsep?

• A “membrane gas dryer” that uses a perfluorocarbon ion-exchange resin

• Can be used to dry or humidify both air and gas

• Developed by AGC and launched in 1990
The sunsep membrane transports water vapor from the inside to the outside of the hollow fiber depending on the “water vapor pressure differential”.

The principle of FORBLUE sunsep
Applications

Your Dreams, Our Challenge
Major Applications

Dehumidification
- Industrial compressed air: pneumatics
- Gas analysis: environmental, medical

Humidification
- Industrial gas treatment
- Medical oxygen gas
- Fuel cell
Purge Gas (Dehumidify Source)

- Purge gas = source of the water vapor pressure differential between inside and the outside of membrane.

- 2 methods of supplying the purge gas:
  - 1. Internal: Using a small portion of the dry gas that is produced
  - 2. External: Providing dry gas from an external source

- The standard purge gas flow rate is 20% of supply gas flow rate.

- The purge gas flow direction should be counterflow.
SWB/C/F Series for Pneumatics Applications

sunsep SWB/C/F series
The Importance of Dehumidifying Pneumatic Lines

- Pressurized air contains a lot of water vapor.
- Water condensation can damage pneumatic equipment.
- To protect the equipment, water vapor has to be removed before it condenses.
Methods of Compressed Air Dehumidification

- Cooling and condensing
  - Cooler (refrigeration/adiabatic compression)

- Absorption
  - Silica gel
  - Zeolite

- Membrane separation
  - Porous membrane (Molecular sieve)
  - Non porous membrane (sunsep)
# Industrial Air Dryer Comparison

<table>
<thead>
<tr>
<th>Type</th>
<th>Air Cooler (Refrigeration)</th>
<th>Absorption</th>
<th>Membrane (Porous)</th>
<th>Membrane (Non porous)</th>
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</thead>
<tbody>
<tr>
<td>Unit Size</td>
<td>Large</td>
<td>Medium</td>
<td>Small</td>
<td>Very Small</td>
</tr>
<tr>
<td>Applicable Flow rate</td>
<td>Large</td>
<td>Medium</td>
<td>Small</td>
<td>Small</td>
</tr>
<tr>
<td>Dew point</td>
<td>-17 °C</td>
<td>-50 °C</td>
<td>-50 °C</td>
<td>-40 °C</td>
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<tr>
<td>Running cost</td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
SWG Series for Gas Analysis Applications

sunsep SWG series
The Importance of Dehumidifying Sample Gas

- Sample gas contains a lot of water vapor.
- Condensed water causes trouble such as corrosion or a decrease in analytical precision.
- So the water vapor has to be removed from the sample gas.
The sunsep hollow fiber membrane is selectively permeable to water vapor only.
### Advantages:
- High water vapor removal
- Chemical resistance
- Little effect on the original gas composition

### Applications:
- Environmental monitoring
- Exhaust gas monitoring
- Expiration gas analysis
FORBLUE sunsep humidification modules are equipped with rust-proof materials.
The sunsep membrane transports water vapor from the outside to inside.
Advantages:
• Easy and fast to make the gas saturated
• Enables gas humidification without direct contact with water
• Low contamination risk from humidification source

Applications:
• Medical oxygen humidification for home oxygen therapy
• Industrial gas humidification
• Humidification for fuel cells
Other Applications

Ammonia scrubber

pH electrode cover
So Why Use sunsep?

- Non-porous, for water-selective permeability
- Available in a wide variety of sizes
- Can be used for drying and humidification
- Easily connectable modules
- Ecological – no energy input required
- Durable, flexible, corrosion-resistant
For More Information:

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